



SCHOOL

ESTRO Technology Transfer Grant (TTG) Report: Prostate and Gynaecological Interstitial Brachytherapy

Host Institute: Mount Vernon Cancer Centre, Northwood, United Kingdom

Date of visit: 9 – 18 March 2020

Aim of the visit:

Our primary aim was to visit the Mount Vernon Cancer Centre (MVCC) as a team (physician physicist and radiotherapist) to learn from and observe an experienced interstitial brachytherapy practice with a wide selection of patients, case management methods, procedures, planning and delivery of treatments, and a multidisciplinary approach to gynaecological and prostate cancers.

The majority of interstitial brachytherapy cases at Mount Vernon are perineal implants of prostate, rectum or gynaecological cancers.

We are aware of the current data to improve local control and overall survival with high-quality brachytherapy, which is absolutely necessary in gynaecological cancers such as cervical, endometrial etc. but also in genitourinary cancers like prostate cancer.

Regarding our future project for high dose rate (HDR) brachytherapy in prostate cancer, which we plan to introduce in our cancer centre, we managed to observe the whole process and this will help us to revise our protocol and to implement it wisely in our practice.

There is less expertise in the practice of brachytherapy among Romanian radiation oncology departments than in more established fields, and our visit was intended to fill that gap. Our experience will help us to start a prostate cancer brachytherapy programme in our department. We hope to share our current experience with our colleagues and train the postgraduate trainees in my hospital.

Details of the scientific content of the visit:

An introductory briefing was first presented which included an overview of cancer epidemiology in the UK, a radiotherapy patient census, equipment availability in the radiotherapy unit, and the radiotherapy staff of the hospital and future projects there. We were then oriented on the hospital's brachytherapy workflow, and taken for a brief tour of the brachytherapy suite, planning, imaging and treatment areas. Ongoing brachytherapy cases for the day were then presented with the corresponding magnetic resonance imaging (MRI) images for discussion of treatment plans.

In the following days we could take part in all the activities within the workflow of a prostate HDR and low dose rate (LDR) brachytherapy case. We could observe how the patients were prepared for the procedures, and we were shown all that we would need to have in the theatre room (ultrasound, needles, different types of templates). We gained lots of experience at MVCC by observing all the team in action and how to be a co-player in an organised and efficient manner.

For LDR implants, we were able to observe: the image acquisition using ultrasound, the contouring of the volumes of interest, how to use the VariSeed System from Varian for dose calculation, principles for acceptable constraints, tips and tricks when approving a plan, follow-up dosimetry and clinical reviews post implant.

For HDR implants, we were able to observe different techniques and approaches but, at the same time, similarities between operators, procedures in theatre from start to finish, and all discussions between anaesthesiology and operating room staff, the radiation oncologist and physicists. We noticed that MVCC used custom-made devices with lab in house/ moulds/ different types of templates when used for perineal implants.

As a team we had a close look at the way in which we should proceed with MRI. We were taught the principles of MRI with the use of a computed tomography (CT)/MRI compatible applicator, and we were shown the optimal image reconstruction to be used and patient bladder-filling during the scans.

We then followed through with the contouring and treatment planning while our physicist was involved with the applicator reconstruction with needles. Final plan evaluation was then reviewed by the team prior to treatment delivery. We were then briefed regarding the institution's protocol for dose prescription and dose constraints in accordance with the Embrace II protocol for locally advanced cervical cancers.

Quality assurance and applicator commissioning were also discussed with our physicist. Our team had a lengthy question and answer session on practical and problematic issues regarding applicators, materials, and software, specifically concerning its applicability in our setting.

Results:

Our team will be holding an echo lecture of our experience in MVCC with the entire staff of our home institution to facilitate adaptation of the techniques and updated protocols that we have learned during our stay. As our centre is also a high-volume centre for brachytherapy of gynaecologic malignancies, we will adapt the workflow of our host institute as MVCC has a continuous and simultaneous flow of the entire treatment process with multiple patients occupying each step of the process, making the system more efficient. Also, as we have observed the importance of good imaging for treatment planning especially for interstitial needle insertions, we will be requesting at least one MRI image pre-brachytherapy for proper target delineation. With the aid of MRI, our team will also start to utilise freehand interstitial techniques as needed for very extensive disease.

Our team would like to convey our sincere appreciation to the entire radiotherapy team at MVCC especially *Professor Peter Hoskin, Dr Roberto Alonzi, Dr Peter Ostler, Dr Robert Hughes, Fellow Shreya Armstrong, Head of Brachytherapy Physics Gerry Lowe, physicist Nicki Groom, physicist David Inchley, physicist Tom O'Brien, physicist Andrei Caraman, consultant radiographer Yat Tsang, and superintendent radiographer Daniel Megias* for their generosity in sharing their expertise in brachytherapy and external radiotherapy.

Finally, our team would like to extend our gratitude to the European Society for Radiotherapy and Oncology (ESTRO) team for giving us the opportunity to learn from a reputable institute to enhance our knowledge and skills in brachytherapy.

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